AMENDMENTS TO THE CLAIMS:

This listing replaces all previous versions, and listings, of the claims in this application.

Listing of claims:

1. (Currently amended) An electrophoresis apparatus for processing compounds in small sample volumes comprising:

(a) a cathode in a static cathode buffer zone or compartment;

(b) an anode in a static anode buffer zone or compartment, the cathode disposed relative to the anode so as to be adapted to generate an electric field in an electric field area therebetween upon application of a voltage potential between the cathode and anode;

(c) a removable cartridge disposed in the electric field area, the cartridge containing a first non-isoelectric separation barrier ~~disposed in the electric field area~~;

~~(d)~~ a second non-isoelectric separation barrier disposed between a selected one of the cathode buffer zone and the anode buffer zone and the first barrier so as to define a first chamber having an interstitial volume of less than 5 mL therebetween;

wherein in use, the removable cartridge containing the non-isoelectric separation barriers is disposed in the apparatus forming the cathode buffer zone and the anode buffer zone, electrophoretic buffer is disposed in the cathode buffer zone and the anode buffer zone, a sample containing one or more compounds is provided to the first chamber; wherein upon application of the voltage potential a selected compound is removed from the sample through one of the first or second non-isoelectric separation barriers and provided to one of the cathode buffer zone or the anode buffer zone; and wherein there is substantially no circulation of buffer or sample in the buffer zones or the first chamber.

2. (Cancel)

3. (Previously presented) The apparatus according to claim 1 wherein the interstitial volume is less than or equal to about 2 mL.

4. (Previously presented) The apparatus according to claim 3 wherein the interstitial volume is from about 0.02 mL to about 0.1 mL.

5. (Previously presented) The apparatus according to claim 1 wherein a ratio of interstitial volume to barrier surface area in the chamber is less than about 1 mL/cm^2.

6. (Previously presented) The apparatus according to claim 1 wherein the ratio of interstitial volume to barrier surface area in the chamber is less than or equal to about 0.5 mL/cm^2.

7. (Previously presented) The apparatus according to claim 1 wherein the ratio of interstitial volume to barrier surface area in the chamber is less than or equal to about 0.1 mL/cm^2.

8. (Previously presented) The apparatus according to claim 1 wherein the ratio of interstitial volume to barrier surface area in the chamber is about 0.02 mL/cm^2.

9. (Previously presented) The apparatus according to claim 1 wherein the first and second barriers are non-isoelectric membranes selected from the group consisting of electrophoresis separation membranes having a defined pore size or restriction membranes which allow flow of ions into and out of a chamber or compartment under the influence of an electric field but do not allow movement of macromolecules, or a combination thereof.

10. (Original) The apparatus according to claim 9 wherein at least one of the first and second membranes is an ion-permeable electrophoresis separation membrane comprised of polyacrylamide and having a molecule mass cut-off from about 1 kDa to about 1500 kDa.

11. (Original) The apparatus according to claim 10 wherein a selected one of the first and second membranes is an ion-permeable electrophoresis separation membrane comprised of polyacrylamide and having a molecule mass cut-off from about 1 kDa to about 1500 kDa and the other membrane is a restriction membrane comprised of polyacrylamide and having a molecular mass cut-off less than the separation membrane.

12. (Previously presented)The apparatus according to claim 1 wherein the first and second separation barriers are non-isoelectric membranes comprised of materials selected from the group consisting of ultrafiltration materials, electrodialysis materials, haemodialysis materials, and combinations thereof.

13. (Canceled)

14. (Previously presented)The apparatus according to claim 1 comprising a plurality of separation membranes space apart defining a plurality of chambers having an interstitial volume of less than 5 mL.

15. (Currently amended) An electrophoresis apparatus for processing compounds in small sample volumes comprising:

(a) a cathode in a static cathode buffer zone or compartment;

(b) an anode in a static anode buffer zone or compartment, the cathode disposed relative to the anode so as to be adapted to generate an electric field in an electric field area therebetween upon application of a voltage potential between the cathode and anode;

(c) a removable cartridge disposed in the electric field area, the cartridge comprising a first non-isoelectric separation barrier ~~disposed in the electric field area~~;

~~(d)~~ a second non-isoelectric separation barrier disposed between the cathode buffer zone and the first barrier so as to define a first chamber having an interstitial volume of less than 5 mL therebetween;

(e) a third non-isoelectric separation barrier disposed between the anode buffer zone and the first barrier so as to define a second chamber having a interstitial volume of less than 5 mL therebetween;

wherein in use, the removable cartridge containing the non-isoelectric separation barriers is disposed in the apparatus forming the cathode buffer zone and the anode buffer zone, electrophoretic buffer is disposed in the cathode buffer zone, the anode buffer zone and at least one of the first and second chambers, a sample containing one or more compounds is provided to a selected one of the first and second chambers; wherein upon application of the voltage potential, a selected compound is removed from the sample through the first separation barrier, and provided to the other of the first and second chambers; and wherein there is substantially no circulation of buffer or sample in the buffer zones, the first chamber or the second chamber.

16. (Canceled)

17. (Previously presented) The apparatus according to claim 15 wherein the interstitial volume is less than or equal to about 2 mL.

18. (Previously presented) The apparatus according to claim 17 wherein the interstitial volume is from about 0.02 mL to about 0.1 mL.

19. (Previously presented) The apparatus according claim 15 wherein a ratio of interstitial volume to barrier surface area in a chamber is less than about 1 mL/cm^2.

20. (Previously presented) The apparatus according to claim 19 wherein the ratio of interstitial volume to barrier surface area in a chamber is less than or equal to about 0.5 mL/cm^2.

21. (Previously presented) The apparatus according to claim 20 wherein the ratio of interstitial volume to barrier surface area in a chamber is less than or equal to about 0.1 mL/cm^2.

22. (Previously presented) The apparatus according to claim 21 wherein the ratio of sample volume to barrier surface area in a chamber is about 0.02 mL/cm^2.

23. (Original) The apparatus according to claim 15 wherein the first separation barrier is an electrophoresis membrane having a defined pore size and the second and third separation barriers are restriction membranes which allow flow of ions into and out of a chamber or compartment under the influence of an electric field.

24. (Original) The apparatus according to claim 23 wherein the separation membrane is an ion-permeable electrophoresis separation membrane comprised of polyacrylamide and having a molecule mass cut-off from about 1 kDa to about 1500 kDa.

25. (Currently amended) The apparatus according to claim ~~24~~ 23 wherein the restriction membrane is comprised of polyacrylamide and having a molecular mass cut-off less than the separation membrane.

26. (Previously presented) The apparatus according to claim 15 wherein the first, second and third separation barriers are membranes comprised of materials selected from the group consisting of ultrafiltration materials, electrodialysis materials, haemodialysis materials, and combinations thereof.

27. (Canceled)

28. (Currently amended) An electrophoresis apparatus for processing compounds in small sample volumes comprising:

(a) a cathode in a static cathode buffer zone or compartment;

(b) an anode in a static anode buffer zone or compartment, the cathode disposed relative to the anode so as to be adapted to generate an electric field in an electric field area therebetween upon application of a voltage potential between the cathode and anode;

(c) a removable cartridge disposed in the electric field area, the cartidge comprising a first non-isoelectric separation barrier ~~disposed in the electric field area~~;

~~(d)~~ a second non-isoelectric separation barrier disposed between a selected one of the cathode buffer zone and the anode buffer zone and the first barrier so as to define a first ~~sample~~ chamber having an interstitial volume of less than 5 mL therebetween;

~~(e)~~ a third non-isoelectric separation barrier disposed between the anode buffer zone an the first barrier so as to define a ~~first separation~~ second chamber having an interstitial volume of less than 5 mL therebetween;

wherein in use, the removable cartridge containing the non-isoelectric separation barriers is disposed in the apparatus forming the cathode buffer zone and the anode buffer zone, electrophoretic buffer is disposed in the cathode buffer zone and the anode buffer zone, and at least one of the first ~~sample~~ chamber and ~~first separation~~ second chamber, a sample containing one or more compounds is provided to the first ~~sample~~ chamber; wherein upon application of the voltage potential a selected compound is removed from the sample through the first or second non-isoelectric separation barriers and provided to the ~~first separation~~ second chamber; and wherein there is substantially no circulation of buffer or sample in the buffer zones or the first ~~separation~~ chamber.

29. (Currently amended) The apparatus according to claim 28 wherein a least a fourth separation barrier is disposed between the second separation barrier and the cathode buffer zone to define at least a third chamber having an interstitial volume less than about 5 mL, wherein

sample is provided to a selected second and third chamber, wherein upon application of the voltage potential, a selected compound is removed from the sample through the separation barriers, and provided to the first chamber.

30. (Previously presented) The apparatus according to claim 28 wherein at least a fifth separation barrier is disposed between the third separation barrier and the anode buffer zone to define at least a fourth chamber having an interstitial volume of less than 5 mL, wherein the sample is provided to selected chambers, wherein upon application of the voltage potential, a selected compound is removed from the sample through the separation barriers, and provided to a selected chamber.

31. (Currently amended) The apparatus according to claim 30 wherein the apparatus further comprises at least a second cathode in a second static cathode buffer zone and a second anode in a second static anode zone disposed relative to the second cathode so as to be adapted to generate an electric field between a selected chamber and another selected chamber.

32. (Currently amended) The apparatus according to claim 15 wherein at least a fifth separation barrier is disposed between the third separation barrier and the anode buffer zone to define at least a ~~second~~ third chamber having an interstitial volume of less than 5 mL, wherein the sample is provided to the first chamber, wherein upon application of the voltage potential, a selected compound is removed from the sample through the separation barriers, and provided to selected chamber.

33. (Currently amended) A method for de-salting or dialysing a small volume sample containing at least one compound and one or more salts comprising:

(a) providing an apparatus according to claim 1;

(b) adding buffer to the cathode and anode buffer zones or compartments;

(c) placing a sample in the first chamber; and

(d) applying a voltage potential, wherein upon application of the voltage potential, and one or more salts in the sample are removed from the sample through a selected one of the first and second separation barriers and provided to a selected one of the cathode buffer zone and the anode buffer zone, wherein at least one compound is substantially retained in the first chamber, and wherein there is substantially no circulation of buffer or sample in the buffer zones and the first chamber.

34. (Previously presented) A method for de-salting or dialysing a small volume sample containing at least one compound and one or more salts comprising:-

(a) providing an apparatus according to claim 15;

(b) adding buffer to the cathode and anode buffer zones or compartments and to at least one of the chambers;

(c) placing a sample in a selected one of the first and second chambers; and

(c) applying a voltage potential between the first and second chambers, wherein upon application of the voltage potential, and one or more salts in the sample are removed from the mixture through a selected one of the first separation barrier and provided to the other of the first and second chamber, wherein at least one compound is substantially retained in first chamber from which the salt is removed, wherein there is substantially no circulation of buffer or sample in the buffer zones, the first chamber, and the second chamber.

35. (Previously presented) A method of separating a compound in a small sample volume by electrophoretic separation comprising:

(a) providing an apparatus according to claim 1;

(b) adding buffer to the cathode and anode buffer zones or compartments;

(c) placing a sample containing one or more compounds in the first chamber; and

(d) applying a voltage potential, wherein upon application of the voltage potential, a compound in the sample is removed from the sample through a selected one of the first and second separation barriers and provided to a selected one of the cathode buffer zone and the anode buffer zone, wherein at least one compound is substantially retained in the first chamber, and wherein there is substantially no circulation of buffer or sample in the buffer zones and the first chamber.

36. (Previously presented) A method of separating a compound in small sample volume by electrophoretic separation comprising:

(a) providing an apparatus according to claim 15;

(b) adding buffer to the cathode and anode buffer zones or compartments and to at least one of the chambers;

(c) placing a sample containing a mixture of two or more compounds in a selected one of the first and second chambers; and

(d) applying a voltage potential between the first and second chambers, wherein upon application of the voltage potential, a first compound in the sample is removed from the mixture through a selected one of the first separation barrier and provided to the other of the first and second chamber, wherein a second compound is substantially retained in first chamber from which the first compound was removed, wherein there is substantially no circulation of buffer or sample in the buffer zones, the first chamber, and the second chamber.

37. (New) A method for de-salting or dialysing a small volume sample containing at least one compound and one or more salts comprising:

(a) providing an apparatus comprising a cathode in a static cathode buffer zone or compartment; an anode in a static anode buffer zone or compartment, the cathode disposed

relative to the anode so as to be adapted to generate an electric field in an electric field area therebetween upon application of a voltage potential between the cathode and anode; a first non-isoelectric separation barrier disposed in the electric field area; and a second non-isoelectric separation barrier disposed between a selected one of the cathode buffer zone and the anode buffer zone and the first barrier so as to define a first chamber having an interstitial volume of less than 5 mL therebetween;

(b) adding buffer to the cathode and anode buffer zones or compartments;

(c) placing a sample in the first chamber; and

(d) applying a voltage potential, wherein upon application of the voltage potential, and one or more salts in the sample are removed from the sample through a selected one of the first and second separation barriers and provided to a selected one of the cathode buffer zone and the anode buffer zone, wherein at least one compound is substantially retained in the first chamber, and wherein there is substantially no circulation of buffer or sample in the buffer zones and the first chamber.

38. (New) A method for de-salting or dialysing a small volume sample containing at least one compound and one or more salts comprising:

(a) providing an apparatus comprising a cathode in a static cathode buffer zone or compartment; an anode in a static anode buffer zone or compartment, the cathode disposed relative to the anode so as to be adapted to generate an electric field in an electric field area therebetween upon application of a voltage potential between the cathode and anode; a first non-isoelectric separation barrier disposed in the electric field area; a second non-isoelectric separation barrier disposed between the cathode buffer zone and the first barrier so as to define a first chamber having an interstitial volume of less than 5 mL therebetween; and a third non-isoelectric separation barrier disposed between the anode buffer zone and the first barrier so as to define a second chamber having a interstitial volume of less than 5 mL therebetween;

(b) adding buffer to the cathode and anode buffer zones or compartments and to at least one of the chambers;

(c) placing a sample in a selected one of the first and second chambers; and

(d) applying a voltage potential between the first and second chambers, wherein upon application of the voltage potential, and one or more salts in the sample are removed from the mixture through a selected one of the first separation barrier and provided to the other of the first

and second chamber, wherein at least one compound is substantially retained in first chamber from which the salt is removed, wherein there is substantially no circulation of buffer or sample in the buffer zones, the first chamber, and the second chamber.

39. (New) The method according to claim 37 wherein the interstitial volume is less than or equal to about 2 mL.

40. (New) The method according to claim 39 wherein the interstitial volume is from about 0.02 mL to about 0.1 mL.

41. (New) The method according to claim 37 wherein a ratio of interstitial volume to barrier surface area in the chamber is less than about 1 mL/cm^2.

42. (New) The method according to claim 37 wherein the ratio of interstitial volume to barrier surface area in the chamber is less than or equal to about 0.5 mL/cm^2.

43. (New) The method according to claim 37 wherein the ratio of interstitial volume to barrier surface area in the chamber is less than or equal to about 0.1 mL/cm^2.

44. (New) The method according to claim 37 wherein the ratio of interstitial volume to barrier surface area in the chamber is about 0.02 mL/cm^2.

45. (New) The method according to claim 37 wherein the first and second barriers are non-isoelectric membranes selected from the group consisting of electrophoresis separation membranes having a defined pore size or restriction membranes which allow flow of ions into and out of a chamber or compartment under the influence of an electric field but do not allow movement of macromolecules, or a combination thereof.

46. (New) The method according to claim 45 wherein at least one of the first and second membranes is an ion-permeable electrophoresis separation membrane comprised of polyacrylamide and having a molecule mass cut-off from about 1 kDa to about 1500 kDa.

47. (New) The method according to claim 37 wherein a selected one of the first and second membranes is an ion-permeable electrophoresis separation membrane comprised of polyacrylamide and having a molecule mass cut-off from about 1 kDa to about 1500 kDa and the other membrane is a restriction membrane comprised of polyacrylamide and having a molecular mass cut-off less than the separation membrane.

48. (New) The method according to claim 37 wherein the first and second separation barriers are non-isoelectric membranes comprised of materials selected from the group

consisting of ultrafiltration materials, electrodialysis materials, haemodialysis materials, and combinations thereof.

49. (New) The apparatus according to claim 37 or 38 comprising a plurality of separation membranes space apart defining a plurality of chambers each having an interstitial volume of less than 5 mL.